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EXCHANGING INFORMATION OVER A TRUSTED NETWORK OF PEOPLE
ECHANGE D'INFORMATIONS PAR L'INTERMEDIAIRE D'UN RESEAU DE PERSONNES DE
CONFIANCE

Patent Applicant/Assignee:

HIGH TECH VENTURES INC, 18 Hurley Street, Cambridge, MA 02141, US, US
(Residence), US (Nationality), (For all designated states except: US)

Patent Applicant/Inventor:

TAKACS Edward, 505 Union Wharf, Boston, MA 02109, US, US (Residence), US
(Nationality), (Designated only for: US)

FINKELSTEIN Boris, 10B Gardener Road, Cambridge, MA 02139, US, US
(Residence), IT (Nationality), (Designated only for: US)

BERCHICCI Giuliana, 505 Union Wharf, Boston, MA 02109, US, US (Residence)
, IT (Nationality), (Designated only for: US)

CLIFFORD James, 14 Greenview Street, Apt. 4, Framingham, MA 01701, US, US
(Residence), US (Nationality), (Designated only for: US)

Legal Representative:

HIEKEN Charles (agent), Fish & Richardson P.C., 225 Franklin Street,
Boston, MA 02110-2804, US,

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English Abstract

Referrals are obtained from people, and at least some of the people are linked based on the referrals to create a trusted network. Linking includes storing relationships between at least some of the people that define at least a portion of the trusted network. Information is exchanged with one or more of the people via the trusted network.

French Abstract

Système consistant à obtenir des recommandations par des personnes et à mettre en relation au moins quelques unes de ces personnes en fonction de ces recommandations afin de créer un réseau de confiance. Cette mise en relation consiste à mémoriser des rapports entre au moins quelques unes de ces personnes définissant une partie du réseau de confiance. Des informations sont échangées entre une ou plusieurs de ces personnes par l'intermédiaire du réseau de confiance.

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Detailed Description

EXCHANGING INFORMATION OVER A TRUSTED NETWORK OF PEOPLE

Background of the Invention

This invention relates generally to creating links
between people based on trust, and to exchanging information
based on those links.

Important decisions are often made based on referrals
from others. For example, one might rely on a referral when
selecting a doctor, a movie, a job, or a potential employee.

Typically, referrals are solicited from those whose judgment
is trusted, particularly for important matters, such as
employment, medical care, investments, and the like.

Heretofore, referrals were obtained directly from the
source or through "word of mouth".

Summary of the Invention

In general, in one aspect, the invention features
obtaining trusted referrals from people, linking at least
some of the people based on the trusted referrals to create
a trusted network on a computer, and using information on
the trusted network. Through the computerized trusted
network, a user is given ready access to the trusted
referrals and other information regardless of the
availability of those issuing the referrals and/or providing
the other information.

This aspect of the invention may include one or more of
the following. The referrals are obtained in response to
requests. Linking includes storing relationships between at
least some of the people that define at least a portion of
the trusted network. Each person on the trusted network is
a node of the trusted network. Information is stored in
association with nodes of the trusted network. The
information relates to a person corresponding to a node of
the trusted network and may be an assessment relating to the
competency of the person corresponding to the node.

Using the information includes sending an electronic
mail (e-mail) message to one or more of the people on the
trusted network. The e-mail message is delivered to the one
or more people based on settings for the one or more people
and based on links in the trusted network. The settings
include listening preferences that define which e-mail
messages a person on the trusted network wants to receive.

The trusted referrals may relate to products and/or
services for sale. The e-mail message includes advertising
for such products or services that is targeted to the one or
more people. The information used on the trusted network is
a referral relating to a person, place or thing, such as
customer referrals for goods and/or services. Using the
information encompasses a buyer and a seller on the trusted
network exchanging information relating to products and/or

services for sale over the trusted network.

Data is obtained about a person on the trusted network of people. Using the information includes matching the person to a position based on the data about the person.

The data includes background information for the person and a desired position. The background information includes a 10 personal profile that includes one or more of educational history, employment history, and skills of the person.

The trusted referrals include trust in judgment and/or trust in professional competency/skills. At least one of the trusted referrals includes information relating to a 15 degree of trust. The degree of trust includes an assessment of the professional competency of a person who is the subject of the at least one trusted referral. Using the information includes obtaining information relating to one or more of the people via the trusted network based on the 20 degree of trust. A rating of trust for a person on the trusted network is obtained based on the degree of trust.

Obtaining the information includes obtaining the information relating to the person only if the rating of trust for the person is greater than a predetermined rating. The rating is obtained based on information about the person that has been provided by people on the trusted network and possibly other people that are not on the trusted network.

In another aspect, the invention features obtaining a referral via a computer-generated network of people who are linked to one another based on trust, and using the referral in a selection process.

This aspect of the invention may include one or more of the following. The selection process includes screening based on the referral. Screening includes screening potential candidates for a position, screening potential products for purchase/use, screening potential positions, screening potential investments, and/or screening potential services for purchase.

In another aspect, the invention features receiving information regarding types of messages that can be received via a trusted network of people, receiving a message via the trusted network of people, screening the message based on the information, and delivering the message if the message comports with the information.

This aspect may include one or more of the following.

The information regarding types of messages that can be received includes listening preferences which are provided via a computer-generated graphical user interface. The types of messages are defined based on one or more of the following: a specific level on the trusted network, specific people on the trusted network, specific streams on the trusted network, and/or a subject matter of the message.

Other features and advantages will become apparent from the following description, drawings, and claims.

Brief Description of the Drawings

Figs. 1 to 3 depict information flow in a trusted network of people.

Fig. 4 is a conceptual representation a trusted network of people.

Fig. 5 is a block diagram of computer network hardware on which an embodiment of the invention is implemented.

Fig. 6 is a flowchart showing a process for exchanging information over a trusted network of people.

Fig. 7 shows an alternative conceptual representation of the trusted network of people.

Fig. 8 is a flowchart showing a process for restricting receipt of information from the trusted network of people.

Fig. 9 is a flowchart showing, a process for obtaining a referral using the trusted network of people.

Figs. 10 to 52 show Web pages which depict an embodiment of the invention relating to employment.

Description

I. General Concept

Generally speaking, the invention is a computer program (or "system") that acts as a brokerage tool for bringing together parties, who are linked based on trust, and who want to fulfill a need through the exchange of goods and services. The system acts as both a referral "bank" and a referral "agent". In its role as a referral bank, the system holds and manages referrals, meaning information that users of the system would give if asked about a particular subject (e.g., person, place, thing, etc.) In its role as a referral agent, the system circulates such information within an established network of people who are linked to one another based on trust, and distributes that information to those in the network of people who have the desire and the right to receive it.,

Networks of people are established by system users themselves, through a process of issuing referrals to, and requesting referrals from, those whom the users trust. For example, if A trusts B, and B trusts C, a trusted network may be established in the system which links A, B and C and, thus, currently-existing trusted networks of A, B and C.

Through this trusted network, information is disseminated and accessed. Since the network is based on trusted referrals, the information obtained through that network will be trusted by those on the network who receive it.

To become part of the system, a user registers via a device connected to a computer network, such as the Internet, and enters relevant information. The user sends requests for referrals to obtain access to another person's network of people (an inbound connection) and issues referrals to others to allow those others to obtain access to the user's network of people (an outbound connection).

The former is referred to as an inbound connection because it allows information to flow inward through the trusted network, meaning from others on the trusted network to the user. The latter is referred to as an outbound connection because it allows information to flow outward through the trusted network, meaning from the user to others on the trusted network. In this regard, information does not actually "flow" through the system. Rather, stored

information is accessed from a database and routed, e.g., via electronic mail based on stored connections between users in the trusted network.

The referrals can include information indicating a level of trust in a person's judgment (called "trusted judgment" or "connection") and a level of trust of the person with respect to a particular skill, professional competency, or the like (called "trusted content"). More specifically, trusted judgment applies to those people that the user trusts for their judgment on specific matters. For example, A may trust B's judgment in hiring technical people or in selecting doctors. Trusted content applies to those people that the user values for their particular skills.

For example, A may value B's skills as a software engineer or as a general practitioner. Thus, there are two different questions to answer when issuing a referral: (i) given each person the user indicated as trusted, does the user believe that this person also has specific skills/competencies that the user values; and (ii) given a person that the user values for specific skills or competencies, does the user trust this person's judgment as well and, if the user trusts this person's judgment, in what respects and in what areas.

For a trusted link to be established between persons A and B, it is sufficient that either A or B refer the other to the system as a trusted person. A trusted link can also be established between A and B if either of them indicates to the system that they trust the other's professional competency/skills. In this case, absent an indication of trusted judgment, a link is established between A and B only. A link based solely on professional competency/skills does not give A access to B's trusted network or vice versa.

A trusted link between A and B will be formed if the system knows either that A trusts B's judgment or that B trusts A's judgment. Only one of these two conditions is needed for A and B to be connected in a trusted network.

Although only one "trusted judgment" input is needed to establish a trusted link between two people, the person who entered the input will determine the direction of information flow through the network. By way of example, assume that A trusts B's judgment, but B does not trust A's judgment (the system does not collect and/or store "non-trust" information; therefore, if B does not trust A, B simply will not refer A to the system). In this case, information will flow through/from A to B, as shown in Fig.

1. This means that when the system is performing a query, it will look for referrals tied to trusted networks for A and B. Referring to Fig. 21 if B trusts A, but A does not trust B, information will flow through B's network into A's network, as shown by the arrow in the figure. If A trusts B and B trusts A, information will flow in both directions from A's network into B's network and from B's network into A's network. This contingency is shown in Fig. 3.

A. Referral Bank

Access to information in the system depends upon the trusted content and the trusted judgments stored in the system. By way of example, assume that A trusts B's judgment in investing and A would recommend B as a stock broker if somebody in A's trusted network needs a stock

broker. Therefore, if somebody is looking for investment advice and is querying through A, the system will look in B's network (meaning, that the system will look at the 10 referrals coming from B - the people B knows and would recommend if he were asked) The system looks in B's network because A has indicated that A trusts B's judgment in investing and because the original query has to do with investing. If someone were looking for a stock broker 15 through A's network, -the system would identify B, since A In another example, assume that A values B as a stock broker, but A does not trust B's judgment in recommending commodities brokers.--- Therefore, if somebody in A's trusted 20 network needs a stock broker, A will recommend B through the system. A does not actually do any "recommending"; this is done automatically by the system, without user intervention, since B is stored in the system as a referral of A.

However, if somebody in A's network is looking for a commodities broker and is querying through A, the referrals coming from and through B will be ignored by the system.

This is because A has not indicated to the system that A trusts B's judgment in recommending commodities brokers.

In still another example, assume that A values B as a stock broker; A has not indicated that he trusts B's judgment with respect to doctors; but A does trust B's judgment in recommending commodities brokers. Therefore, W if somebody in A's trusted network needs a stock broker, 10 A will recommend B through the system (as noted previously, this is done automatically by the system, without user intervention, since B is stored as a referral of A); (ii) if somebody in A's trusted network is looking for a doctor and is querying through A, the referrals coming from and through 15 B will be ignored by the system, since A does not trust B's judgment with respect to doctors; and (iii) if somebody in A's trusted network is looking for a commodities broker and is querying through A, the system will look in B's network (meaning that the system will look at referrals coming from 20 and through B - the people B knows and would provide referrals for if asked), since A does trust B's judgment in recommending commodities brokers.

Thus, in this capacity, the system acts as a broker between one person who wants to buy goods and/or services and another person who wants to sell goods and/or services.

For example, a patient wishing to "buy" the services of a doctor may use the system, in particular the trusted links, to obtain a referral for a doctor. The patient thus uses the system to obtain a referral for a doctor in the system who is "selling" his services.

The system may also be used to obtain referrals based on the actions of those in the system whom the user trusts. For example, if person A is searching for a compact disc (CD), A may query through the trusted stream of another person B, whose taste in music the user trusts. In this context, "trusted stream" refers to the set of people connected by trusted links going out to the Nth ($N > 1$) level of a trusted network, and corresponds to branches of a trusted network starting at a particular node (person).

In response to the-query, recommendations for CDs may be obtained from B or those in B's trusted stream. In addition, the system may store, at each node of the trusted

network, information, indicating, for example, which CDs B and those in B's trusted stream have purchased recently.

Instead of, or in addition to, returning the recommendations of B and/or those in B's stream, the system may provide A with information indicating which CDs have been purchased by B and those in B's stream.

B. Referral Bank

In addition to providing access to referrals, information can be exchanged over a trusted network in several ways. For example, information can be transmitted 5 by streamcasting, which means to transmit the information through one or more streams. Other activities relating to exchanging information over a trusted network include streamresearching, which includes looking for referrals (or other information, depending upon the specific application) 10 independently of previously-set listening preferences and previous queries; streamsearching (or querying), which allows users to search through specified streams for information; and backstreaming, which means to validate 15 that the user received through people that trust the user.

These functions allow users to disseminate and access information through trusted networks.

Users in a trusted network can set "listening preferences" to specify which information flowing through 20 the network that they want to receive and, consequently, which information that they want to ignore. More specifically, the listening preferences allow a user to select which information to listen for, to specify those people in the user's immediate trusted network that the user wants to hear from, and to choose from which level in a trusted network to receive information - from a first level to an entire trusted stream. In this context, a "level" of a trusted network refers to the number of people (i.e., 5 network nodes) removed from the user in the network. For example, those directly connected to the user are said to be in the first level of the trusted network relative to the user. As noted above a, "trusted stream" refers to a branch of a trusted network starting at a particular node (person) In the context of the present system, information transmissions through trusted networks do not require any action from users (network nodes). Users of the system "transmit" by virtue of being nodes in the system. As such, they are passive as to what is being transmitted; they do 15 not initiate the activity of transmitting. By contrast, streamcasting is initiated by users. Individuals have the ability to streamcast as users of the system. Individuals streamcast when a message is initiated and sent by them to others on the system-. Users can decide what levels of a 20 trusted network to which the message should be sent. For those directly linked to the user, the user can also specify which of them will receive the message.

By way of example, Fig. 4 shows a trusted network containing persons A, B and C. Assume that A both trusts B and values B as a stock broker. If C is looking for a stock broker, a query is transmitted through A and B without A and B even knowing it. If C is streamcasting a press release through A (e.g., to those on A's trusted network), the press release gets transmitted to users linked to A or in A's stream and is delivered to those users 3 that have set the

appropriate listening preferences. Person A will receive the message if his listening preferences comply with the message features (content/level sending or person sending) without any action on A's part.

Streamcasting can also be used to target advertising to users on the system who have their listening preferences set to receive such information. Advertising may be transmitted through a trusted stream based on the trusted links in that stream. For example, if A trusts B's judgment in purchasing automobiles, B may streamcast automobile advertisements through A's stream (provided the appropriate links have been established) Anyone in A's stream who has their listening preferences set to receive such information will receive the advertising. Because of the trusted nature of the links that define A's stream, those people on A's stream who receive the advertising (including A) will give the advertising more credence than "regular" advertising.

Thus, to summarize, individuals become users of the system by (i) registering, (ii) entering information about themselves, (iii) entering their trusted network and creating connections to the trusted network, and (iv) setting their listening preferences. To create connections to a trusted network, the user: - (i) specifies those people to whom the user has a direct connection; (ii) sets inbound connections by sending requests for referrals asking people to refer the user into their networks by entering 10 trust/skill evaluation information in the system, and (iii) sets outbound connections by referring people in the user's network to the system by entering trust/skill evaluation information into the system. In specifying listening preferences, the user is given three sets of variables from 15 which to select. These include: (i) for what information the individual is listening, (ii) from which level of the network the individual is listening for information, and (iii) from whom in the network the individual wants to receive information. Once the appropriate access and 20 settings have been set, information can be exchanged over the trusted network.

II. Hardware And Software

Referring to Fig. 5, a network system 10 is shown for implementing an embodiment of the invention. Network system, 10 includes a server 11, which communicates with 5 computer 12 over computer network 15. Computer network 15 may be any private or public network, such as a local area network (LAN) , a wide area network (WAN) , or the Internet.

Computer 12 is a personal computer (PC) or any other type of processing device, such as a laptop computer, a hand-held computer, or a mainframe computer. Computer 12 includes input devices (not shown), such as a keyboard and a mouse, for inputting information and accessing data, and a display screen for viewing such data and other images. Server 11 is a computer, such as a PC or a mainframe computer, which executes a computer program to generate and traverse a trusted network of people (it is noted that a "trusted network" in the context of the present invention is an entirely different construct from network system 10 shown in Fig. 1 and that the two are unrelated except insofar as a trusted network is established and accessed via network system 10). View 16 shows the architecture of server 11.

The components of server 11 include a processor 17, such as

a microprocessor or microcontroller, and a memory 19.

Memory 19 is a computer hard disk or other memory storage device for storing a database 20 and computer programs 21.

Among the computer programs 21 stored in memory 19 are an 'Internet Protocol (IP) stack 22, for communicating over computer network 15, and engine 24. Engine 24 includes 5 computer instructions that are executed by processor 17 to generate graphical user interfaces (GUIs), such as the web pages described below, and to generate and traverse a trusted network of people.

Fig. 6 shows a process 25 for establishing a trusted 10 network of people and for using that trusted network to exchange information among the people on the network. In this embodiment, process 25 is performed by engine 24 based on user inputs provided through-computers, such as computer 12. The invention, however, is not limited to use in this 15 environment.

Process 25 begins by-obtaining (or "harvesting") (601) referrals from "reviewers", meaning those issuing the referrals, and storing those referrals in database 20. What is meant by "referrals" here is the trusted content and/or 20 trusted judgment noted above. For example, a reviewer might believe that a subject (of the referral) provides reliable referrals on all topics. Alternatively, the reviewer might believe that the subject provides reliable referrals relating only to some topics, such as employment and movies, but not-to other topics, such as doctors. Referrals may be obtained by issuing (601a) requests to reviewers and receiving (601b) the referrals in response to the requests.

Requests and responses are typically issued via electronic mail (e-mail) over network 15; however, other electronic or non-electronic transmission media may be used. Requests are issued (601a) at the behest of the subject of the referral.

For example, the subject may request a referral from a reviewer by filling out a request form and transmitting that request to the reviewer via e-mail.

Process 25 links (602) people based on the referrals obtained in 201 to create a trusted network. There may be more than one link between two people on a trusted network if referrals exist between the two people that relate to different topics. Fig. 7 shows a representation of a trusted network 26. The--representation shown is not actually stored; rather the relationships (i.e., the links) between nodes (people) on the network are stored. In particular, information is stored defining links between 20 nodes on the trusted network. Process 25 links the people by traversing database 20 and defining associations between the nodes based on the referrals.

As noted above, a trusted network may contain several levels, defined here as a private trusted network, an extended trusted network, and a global network. Taking person/node 27 as an example, private trusted network 28 for person 27 includes all those on network 26 to whom person 27 has a direct link (inbound and/or outbound), namely persons 29 to 32. The links in private trusted network 28 include those people about whom person 27 has provided a referral or have provided a referral for person 27. Thus, the links include those who person 27 trusts, either for their

judgment or professional competency/skills.

Since person 27 has provided the system with referrals for persons 29 and 32, person 27 can transmit ("streamcast") queries and information to and through persons 29 and 32, but person 27 will not automatically receive information or queries through persons 29 and 32. Person 27 will receive information from, and through, persons 29 and 32 only if persons 29 and 32 trust person 27, have issued a referral to person 27, and links have been created and stored in the system which indicate that trust.

The extended trusted network 34 for person 27 includes all those in person 27's private trusted network 28 and all those who are linked to people in person 27's private trusted network 28. For example, person 35 is in extended trusted network 34, as are persons 36 to 45. Persons 36 to 45 are in person 27's extended trusted network because they are links in various unbroken chains leading to person 27.

As noted, these links are established through the exchange of referrals by those on network 26.

Trusted streams are defined based on a single person's link to person 27. For example, person 32 constitutes the entry point to stream 33 relative to person 27.

A global network includes all people who are registered with server 11, together with data associated with each of those people. Thus, the global network includes all those on network 26 who are registered with the system.

Each person on network 26 may specify people on network 26 from whom messages can be received. This is done by specifying listening preferences (described above). By specifying listening preferences, a person can specify that messages are to be received from only people on the person's private trusted network, from a specific stream, or that only messages having specific content are to be received.

Process 25 receives (603) such data specifying listening preferences from people on network 26, e.g., during a registration process, and stores the data at the appropriate node of network 26. In 603, process 25 may also receive other data, such as a personal profile of the user including educational history, skills, and employment history, and other information specific to the user. Uses for such information are described below.

The data of 603 may be used when process 25 exchanges (604) information via network 26. For example, a person 27 on network 26 may transmit a message to all those on his private trusted network 28. The message is then routed (e.g., by e-mail) to all those on private trusted network 28. Whether the message will be delivered to a person on private trusted network 28 is determined by that person's listening preferences. If a person's listening preferences indicate that he will not accept a particular message, that message is not delivered to that person. Actual transmission and delivery of the messages "through" network 26 is performed by the system, which retrieves the e-mail addresses of all those linked directly (for private trusted network transmission) and/or indirectly (for extended trusted network transmission) to person 27 and forwards the message to those e-mail addresses.

Fig. 8 shows a process 47 that is used by person 27 on network 26 to restrict receipt of messages from other people on network 26. Process 47 may be implemented in engine 24 in connection with appropriate software on computer 12.

Process 47 begins with person 27 providing (801) information identifying which types of messages that person wants to receive. This is typically done by selecting listening preferences on a GUI, such as a Web page output by server 11. Process 47 receives (802) a message directed to person 27 over network 26. Process 47 screens (803) the message to determine if the message is of the type that person 27 wants to receive. For example, person 27 may want to receive messages relating to particular topics, such as employment opportunities. In this case, process 47 screens (803) the message to determine if it relates to such a topic. Alternatively, person 27 may want to receive messages based where those messages were transmitted from in network 26. For example, person 27 may want to receive messages from those people on his private trusted network 28, but not from other people. In this case, process 47 screens (803) the message to determine if it came from someone on person 27's private trusted network 28. If the message comports with the type of message that person 27 wants to receive (804), process 47 delivers (805) the message to person 27's computer. Otherwise, process 47 ignores (806) the message, meaning that it does not deliver the message to person 27.

Trusted network 26 may be used to distribute information to its members/nodes. Such information may include, for example, targeted advertising, information relating to employment opportunities, investment advice, news clips, or any other type of announcement. Whether this information is actually delivered to those on network 26 depends on the listening preferences set by those members.

To distribute information, a member of network 26 need merely specify people and/or subnetworks to receive the information. For example, information may be streamcast to a particular stream of private trusted network 28.

Fig. 9 shows a process 50 for obtaining referrals using network 26. Process 50 may be implemented, at least in part, in engine 24. As noted, a referral may relate to any subject matter. For example, it may relate to a candidate for a position, a doctor, a movie, investment advice, or anything else about which a person wants a referral and for which information is available via network 26.

A referral is obtained (901) by querying database 20.

Referrals are obtained by retrieving stored referrals from people on a private trusted network or an extended trusted network. For example, each person on extended trusted network 34 may store a referral for a doctor. Since extended trusted network 34 is based on trust between people on the network, if person 27 is searching for a doctor, person 27 can retrieve referrals for doctors via the system.

For example, assume that person 27 trusts person 29's judgment with respect to referring doctors and that person 29 has a referral to person 43, who is a doctor. In 901, the system goes from person 27, through person 29, to obtain

a referral for person 43. The system then provides person 5 29 with an indication that person 43 is a "referred" doctor.

Of course, referrals obtained in 901 can be more complicated than this, and include, but are not limited to, all of the examples set forth in the "General Concept" section above.

The referral obtained in 901 may be used as part of a 10 broader selection process (902). The selection process may include screening a person based on the referral. For example, if the referral is for a candidate for a position, the selection process will include screening the candidate; if the referral is for a position at a company, the 15 selection process will include screening the position; if the referral relates to investments, the selection process will include screening the investments; if the referral relates to potential products or services for purchase/use, the selection process, will include screening the potential 20 products or service providers; and so on. The screening process may take into account various factors and is performed "off-line" based on referrals and/or information obtained via process 50.

III. "Employment" Embodiment

The following describes an embodiment of the invention for use in an employment context. Initially, the user registers with the system via a registration page 50 (Fig.

5 10). Registration-page 50 includes entries for the user's first name 51, last name 52, e-mail address 53, user supplied password 54, password confirmation 55, and a challenge question 56 and response 57. Clicking on register button 59 registers the user with they system. Upon 10 registration, the user receives a system-generated private identifier (ID), which identifies the user to the system.

The user enters the system through login page 60 (Fig. 11) by entering the private ID 61 and password 62.

From there, the system displays menus 64 (Fig. 12) for selecting various options. These options correspond to functions available via -engine 24. A description of the menus and options is as follows.

Profile menu 65 displays options 67 to 69. Option 65 ("My Contact Information") displays Web page 70 (Fig. 13).

20 A user provides contact information to server 11 via Web page 70. This contact information includes the user's address 71, e-mail address 72, primary phone number 73, secondary phone number 74, and facsimile number 75. An option 76 is also provided for allowing server 11 to share one or more elements of the user's contact information with others on the user's private inbound network. The user's contact information is transmitted from computer 12 to server 11. The information is stored in association with the user's private ID in database 20. Update button 77 updates the user's contact information in the system. Web page 70 also displays a list 79 of those people on the user's private trusted network, along with information indicating whether the people listed are on the user's inbound 80 or outbound 81 trusted network. List 79 includes the name 82 of each person on the user's private trusted network. Add button 84 allows the user to add people to his private trusted network. List 79 is included on many of the

Web pages shown below and, therefore, is noted here only.

Option 68 ("Desired Job") provides server 11 with information about a job that the user is seeking. option 68 displays Web page 85 (Fig. 14). On Web page 85, box 86 indicates the position/function that the user is seeking.

Box 87 indicates the level at which the user wishes to enter an organization. Boxes 88 to 90 indicate the user's willingness to move and date of move. Box 91 indicates the maximum number of miles the user is willing to commute based on the user's zip code. Box 92 is reserved for comments regarding the type of job desired by the user. Box 93 indicates the number of years that the user has been in a specific industry. Box 94 indicates the type of company at which the user wants to work, meaning one in the prefunding stage, in the funded stage, in the about to IPO ("Initial Public Offering") stage, or in the post IPO stage. Share boxes 95 indicate whether the user has authorized server 11 to make corresponding information available to companies (i.e., potential employers) on the system. Share boxes 96 indicate whether the user has authorized server 11 to make the information available to those on the user's private inbound network. Check boxes 97 and 98 indicate whether the user is currently listening for full-time jobs or consulting jobs, respectively.

Option 69 ("My Background") displays Web page 99 (Fig.

15). Web page 99 shows background information regarding the user's professional profile, including employment history 100, education 101, and skills 102. For each company 104, employment history 100 includes dates of employ 105, level 106 (meaning position), functional area 107, and title 108 of the user. Education 101 lists schools the user attended, among other things, and skills 102, lists the users skills. Option 110 allows the user to share the background information with those on the user's private inbound network. Option 111 allows the user to share the background information with companies on the system.

Hyperlink 112 allows the user to edit their employment history. Clicking on hyperlink 112 displays Web page 113 (Fig. 16). Web page 113 allows the user to edit the information shown, to add an employment record via button 114, or to add a leave of absence via button 115. Web page 113 indicates whether the information can be shared with those on the user's private inbound network 117 or to companies 119 registered with the system.

To change an employment record via Web page 113, the user clicks on a hyperlink, such as 120, that corresponds to a company name. This displays Web page 121 (Fig. 17). Web page 121 includes options for changing/entering the company name 122, address 123, start date 124, end date 125, primary function 126, secondary -function 127, level 128, title 129, and comments 130. Options 131 allow the user to select whether the info rmation can be shared with those on the user's private inbound network or to companies registered with the system. Clicking on update button 132 updates this information on Web page 113 (Fig.,16). Cancel button 133 cancels the current action; and delete button 134 deletes newly-entered information.

Clicking on hyperlink 135 (from any of Web pages 99,

113 or 121) displays Web page 136 (Fig. 18). Web page 136 allows the user to edit their education history. Add button 137 allows the user to add additional education information.

Web page 136 displays educational history information which includes the university 140 that the user attended, degree awarded 141, major 142, and indications 145 and 146 as to whether this information can be shared with those on the user's private inbound network and/or companies 10 registered with the system. Clicking add button 137 or on a hyperlink 149 that corresponds to university attended displays Web page 150 (Fig. 19).

Web page 150 allows the user to edit/add educational information, including school name 151, address 152, major 153, degree 154, begin date 155, end date 156, graduation information 157, minor 158, honors 159, GPA (grade point average) 160, and comments 161. Options 162 allow the user to select whether the information can be shared with those on the user's private inbound network or to companies 20 registered with the system. Clicking on update button 164 updates this information on Web page 136 (Fig. 18). Cancel button 165 cancels the current action.

Clicking on hyperlink 166 (from any Web page) displays Web page 170 (Fig. 20). Web page 170 allows the user to edit their current skills 171. Add button 172 allows users to add a new skill; remove button 173 allows users to remove an existing skill; and save button 174 allows users to save new skill settings. Options 175, 176 and 177 provide different ways for a user to add a new skill to their current skills 171.

More specifically, option 175 allows users to enter skills manually. Option 176 allows users to choose skills by category. Clicking on the button corresponding to option 176 displays Web page 180 (Fig. 21). Web page 180 allows users to select skills from category set 181. Add button 182 adds skills from category set 181 to selected skills set 184. Clear button 185 clears a selected skill from selected skills set 184 and save button 186 saves a new selected skill set. Referring back to Fig. 20, clicking on the button that corresponds to option 177 displays Web page 190 (Fig. 22) Web page 190 allows users to select from an alphabetized skill list. The functions of add button 191, clear button 192, and save button 193 are the same as their counterparts in Fig. 21.

Referring back to Fig. 12, menu option 200 includes three options: "My Peoplestream Network" 201, "Get Connected" 202, and "Message History" 203.

Clicking on "My Peoplestream Network" 201 displays Web page 204 (Fig. 23). Web page 204 includes a list 205 of all those people on the user's private trusted network. The people are listed by name 206 and include information indicating whether there is an outbound connection 207 between the user to the person listed, and information indicating whether there is an inbound connection 208 between the user and the person listed. People, such as person 209, who have no established inbound or outbound connection, but who have been invited to join the system by 10 the user, may also be listed on Web page 204. Other information listed for each person includes the user's rating of each person's professional competency 210, whether

the user trusts each person's judgment 211, if a contact has been disabled 212 between the user and the person, and the 15 last message 213 exchanged between the user and the person listed. Information (not shown) may also be provided which indicates whether the person listed belongs to the user's core network. "Core network" here refers to preferred nodes/people in a user's private trusted network with which 20 the user exchanges information. The core network may be specified beforehand and may be used to send information to/receive information from specific trusted streams. A person need not specify a core network.

Add button 215 on Web page 204 displays Web page 216 (Fig. 24). Through Web page 216, the user can enter a referral for a person. The one entering the referral should have the private ID of the subject of the referral. The private ID is obtained from this person, who has sole access to the private ID. The referral includes this private ID 217 and other information, such as the name 218 of the subject, a (subjective) professional competency assessment 219 selected via a pull-down bar 220, an indication 221 of whether the user trusts the person's judgment of others, an indication 222 of whether the reviewer worked with the subject, the duration of time 223 that the reviewer worked with the subject, the relationship 224 between the reviewer and the subject, an indication 225 of whether the user would like to share his profile with the person, a comments section 226, and a hyperlink 226 for viewing professional information of the person (A-BHAMMAR) As shown, pull-down bar 220 lists different degrees of trust in the person's professional competency. The user can select from these options, which then stores the data in database 20.

Referring back to Fig. 12, "Get Connected" option 202 displays Web page 230 (Fig. 25). Web page 230 allows the user to send an e-mail requesting the recipient to register with the system. The e-mail includes a message 231 instructing the recipient as to how to proceed, along with the user's private ID 232. This information is needed for the recipient to establish connection to the user's trusted network.

"Message History" option 203 allows the user to obtain information about messages from Web page 240 (Fig. 26), such as invitations to join the system, that the user has sent.

This information includes the identity 241 of the person to whom the message was sent, the date 242 that the message was sent, and the "type" 243 of the message, e.g., e-mail.

Clicking on a hyperlink 244 from Web page 240 displays Web page 245 (Fig. 27). Web page 245 displays the content of the message, in addition to the information noted above.

Referring back to Fig., 12, clicking on listening center menu 247 gives the user access to listening center options provided through server 11. Generally speaking, these options allow the user to determine which messages to listen for and which contacts to disable.

Clicking on listening preferences option 248 displays Web page 249 (Fig. 28) Generally speaking, listening preferences include (i) what information the individual is listening for, and (ii) from which level of the network the individual is listening for information. There are three groups individual users can listen to: (i) private trusted

network, meaning people to whom the individual has a direct link, (ii) stream, meaning people who are indirectly linked to the individual (this may be limited to corporate users or "hiring managers"), and (iii) the system proprietor, in this case, Peoplestream.-com. There are three types of messages individual users can listen for. These include information from/about companies, such as press releases and job information, Peoplestream.com news and information, and personal information from other individual users on the network.

Web page 249 allows the user to select which messages to receive. Server 11 routes these messages to users based on, their listening preferences provided that the users are in the appropriate stream and meet the necessary requirements. For example, a user may select to listen to his private inbound network 250 and/or from his inbound streams 251 (including the private inbound network and those linked to the user's private inbound network). The user can set listening preferences to listen for streamcast messages, 20 including messages from the user's private inbound network 253 and press releases 254. The user can set listening preferences to listen for streamsearch messages 255, including messages relating to full-time career opportunities 256, consulting job career opportunities 257, and advice 258. In addition, the user can set listening preferences to listen for messages from the system administrator, in this case Peoplestream.com. These listening preferences include information pertaining to new companies 260, companies receiving new funding 261, and changes in company status 262.

Those messages that the user wants to receive (as set in the listening preferences) are routed to the user via e mail by virtue of the links among people that define trusted network 26. Messages that the user does not want to receive are ignored in that they are not routed to the user. Referring back to Fig. 12, clicking on disable contact option 264 displays Web page 265 (Fig. 29). Web page 265 allows the user to disable a connection to another person in 15 the user's private trusted network. As noted above, messages are routed based on associations between people on the user's network. If a contact (i.e., a person) on that network is disabled, this means that the user will no longer accept messages routed through that contact.

The user can specify which contact to disable by clicking on Add button 266, which displays Web page 267 (Fig. 30). There, the user can enter a private ID 269 corresponding to a link in the user's private trusted network that the user wants to disable. Comments 270 may also be entered regarding the link. Web page 273 (Fig. 31) can be accessed via hyperlink 272 on Web page 267. There, the user can disable company contacts. For each e-mail, the system gives its users the option to disable whoever sent the e-mail.

Referring back to Fig 12, selecting company pipeline & research menu 275 provides ways for a user to get information about, and evaluate, a company registered with server 11. Company Pipeline & Research Menu 275 provides the user with options 276 to 278.

Pipeline option 276 displays a Web page 277 (Fig. 32) that lists companies registered with server 11 to which the

... user is positively associated (e.g., through links in-the user's trusted network) and with which the user has had some relationship/activity. Pipeline option 277 provides information indicating job openings (levels) 279 at a listed company 280 and an area 281 for notes/comments. Clicking on hyperlink 282 displays Web page 284 (Fig. 33). Web page 284 allows the user to add a new company to the user's pipeline.

This is done by entering the company in box 286, the location 287 of the company, and/or a relevant industry 290.

Referring back to Fig. 32, clicking on hyperlink 290 displays Web page 291 (Fig. 34). Web page 291 displays the user's activities with a particular company listed in the user's pipeline. These activities may include, for example, hiring activities, such as interviews, receipt of an offer for employment, rejections, etc.

Referring back to Fig. 12, streamresearch option 277 5 displays Web page 300 (Fig. 35). Web page 300 shows a list of companies 301 that have job openings 302, that the user is positively associated to, and that belong to the user's trusted referral network. Messages may be sent to the hiring manager(s) of these companies . For example, by 10 clicking on "Send Profile" button 304, users can send their information, such as that shown in -Web page 99 (Fig. 15), to one or more companies selected in boxes 305.

Referring back to Fig. 12, discovery option 278 displays a Web page 307 (Fig. 36) that includes a list 308a 15 of companies registered with server 11 with a brief description of each. Clicking on a hyperlink 309a that corresponds to a name of a company provides additional information about the company (Fig. 37). Discovery page 307 includes: "Company., S'earch" 308 and "Job Search" 309.

Clicking on "Company Search" link 308 displays Web page 310 (Fig. 38). From there, the user can search for companies registered with the system as noted above.

Clicking on "Job Search" link 309 displays Web page 312 (Fig. 39). Web page 312 lists companies 313 that have job openings 314 that correspond to the information input by the user in Web page 85 (Fig. 14). More specifically, as shown in Fig. 14, the user input "software engineer" as a desired job in Web page 85. Web page 32 therefore displays 5 companies 313 registered with the system that have jobs 316 that correspond to the user's initial search criteria (in this case, "software engineer").

As noted above, Fig. 37 (Web page 320) displays information for companies listed on Web page 307 (Fig. 36) 10 The information is shown in the figure; however additional information may be displayed if desired. Web page 320 also displays two buttons: backstream and genealogy. Referring to Fig. 40, genealogy 321 displays company history and associations with respect to employees 322, founders 323, 15 key hires 324 investors 325, board members 326, competitors, and/or targets (these last two options are available for corporate users only). Backstream 327 allows users to determine if there is a trusted connection from the user back to a company via the user's trusted network. Clicking 20 on Backstream button 327 displays Web page 330 (Fig. 41).

Web page 330 allows the user to determine if there is a backstream to employees 331, founders 332, key hires 333, investors 334, and/or board members 335 of company 309. The position of each person within the company is stored in database 20 with server 11. The user can send their profile to company 309 via "Send Profile" button 340.

Referring back to Fig. 12, "Streamsearch & Streamcast Tools" option 341 provides options for issuing queries through the system to search for people to fill a position and/or to search for advice. In this embodiment, "Streamsearch & Streamcast Tools" option 341 is used by hiring managers (corporate users) only; however, the invention is not limited as such. Streamsearch option 342 displays Web page 344 (Fig. 42). Web page 344 includes options for entering a job description ("Job (Full Time)" hyperlink 345), for entering a consulting services description ("Consulting Services" hyperlink 346), and for entering an advice description ("Advice" hyperlink 347).

Clicking on hyperlink 345 displays Web page 350 (Fig. 43) Web page 350 shows---(in this case, the hiring manager) current job descriptions in the system. A job description includes job title 351 (e.g., Internet Engineer) and functional area 352,--(e.g., Software Engineering).

Information is also provided which indicates when the job description was modified 353, by whom it was modified 354, and whether the job is currently open 355. Clicking on Add button 356 allows the user to enter a new job description into the system via Web page 358 (Fig. 44). Web page 358 may also be displayed to edit an existing job description by clicking on a hyperlink (e.g., 359) that corresponds to the job description. As shown, Web page 358 allows the user to edit/add a description of the job 360 and candidate requirements 361.

Web page 350 also keeps track of queries (also called "streamsearches") 365 that have been run, when they were last run 366, by whom such queries were last modified 367, and the results 368 of the queries.

Clicking on add button 369 displays Web page 370 (Fig.

45) Web page 370 allows the user to set up a streamsearch through database 20 and/or trusted network 26 or any subnetwork thereof for the information specified in Web page 370. For example, the user can define a streamsearch (i.e., 15 "query") to search for a candidate for a position. In Web page 370, the user specifies a start person 371 (meaning a person in the user's private trusted network in which to start the query), the job 372 to be filled, the name 373 of the streamsearch, and how often (scheduling 374) the streamsearch is to be run.

The user may also specify filters for the search.

These filters, which operate in engine 24, match candidates based on specified criteria. For example, "match required skills,, option 375 requires that the skills of the candidate (on Web page 99 of Fig. 15) match one or more of those of the job description (Web page 358 of Fig. 44). Options are also provided for including candidates that have already been contacted by the system 376 and for including candidates that have previously been excluded 377.

Ratings filter 380 excludes candidates based on ratings for the candidates. These ratings are determined based on the degree of trust in a person's professional competency (option 219 of Web page 216 in Fig. 24). The rating of a person may be determined by processing, e.g., averaging, the degrees of trust input by all people on the global network of the system. This is called the "global rating".

Alternatively, the rating may be determined by processing, e.g., averaging, the degree of trust input by only people on the user's trusted network. This is called the "local rating". Either rating determination method may be used.

The system searches through the trusted stream starting with start person 371 based on the rating specified in filter 380. That is, the system looks for referrals through the trusted to those people who have a rating the same as, or higher than, the rating input in 380. Results Web page 390 (Fig. 46) displays the results of the streamsearch input on Web page 370. The information returned includes the rating 391 of each candidate, the current title 392 of the candidate, the number of years of experience 393 that the candidate has, and the candidate's prior companies 394. A check box 395 is also provided to indicate whether the candidate will be contacted.

Figs 47 and 49 show Web pages 400 and 401 that correspond to Web page 350. Web pages 400 and 401 relate to obtaining candidates for consulting jobs and advice on a selected topic via the system. The actions performed with respect to Web pages 400 and 401 are analogous to those 10 performed with respect to Web page 350.

Referring back to Fig. 12, "Screamcast" option 410 displays Web page 411 (Fig. 49). Web page 411 displays messages to be streamcast over one or more of the user's trusted streams. Clicking on hyperlink 412 displays Web page 413 (Fig. 50), which shows the contents of the message streamcast by the user. In this example, the message is a press release; however, other messages may be streamcast, such as the targeted advertising described above. No content for the press release is shown in Fig. 50.

Referring back to Fig. 12, clicking on "Candidate Pipeline" option 420 displays Web page 421 (Fig. 51). Web page 421 displays a list of candidates (e.g., potential hires) who have responded to queries from the user (in this case, the hiring manager). Clicking on hyperlink 422 displays Web page 423 (Fig. 52). Web page 423 displays history information for candidates specified in Web page 421. In particular, Web page 423 displays information in notes section 424 indicating activity between the candidate and a company represented by the user.

Figs. 10 to 52 show only one-representative embodiment of the invention. The invention, however, is not limited to the embodiment shown. Moreover, the invention is not limited to use with the particular hardware/software 10 configuration of Fig. 5; it may find applicability in any computing or processing environment. The invention may be implemented in computer programs executing on programmable computers that each includes a processor, a storage medium readable by the processor (including volatile and non 15 volatile memory and/or storage elements), at least one input

device, and one or more output devices. Program code may be applied to data entered using an input device to perform the processes-described above and/or to generate output information, such as-Web pages, for display.

Each such program may be implemented in a high level procedural or object-oriented programming language to communicate with a computer system. However, the programs can be implemented in assembly or machine language. The language may be a compiled or an interpreted language.

Each computer program may be stored on a storage medium or device (e.g., CD-ROM, hard disk, or magnetic diskette) that is readable by a general or special purpose programmable computer for configuring and operating the computer when the storage medium or device is read by the computer to perform the processes described above. The invention may also be implemented as a computer-readable storage medium, configured with a computer program, where, upon execution, instructions in the computer program cause the computer to operate in accordance with the processes and the Web pages described above.

Other embodiments not described herein are also within the scope of the following claims.

Claim

A method comprising:
obtaining trusted referrals from people;
linking at least some of the people based on the
trusted referrals to create a trusted network on a computer;
and
using information on the trusted network.

2 The method of claim1 . wherein obtaining comprises
receiving the referrals in response to requests.

3 The method of claim1 , wherein linking comprises
storing relationships between at least some of the people
that define at least a portion of the trusted network.

4 The method of claim1 , wherein:
each person on the trusted network comprises a node of
the trusted network; and
the method further comprises storing information in
association with nodes of the trusted network.

5 The method of claim 4, wherein the information
relates to a person corresponding to a node of the trusted
network.

. The method of claim 5, wherein the information
comprises an assessment relating to competency of the person
corresponding to the node.

7 The method of claim1 , wherein using the
information comprises sending an electronic mail (e-mail)
message to one or more of the people on the trusted network.

8 The method of claim 7, wherein the e-mail message
is delivered to the one or more people based on settings for
the one or more people and based on links in the trusted
network.

9 The method of claim 8, wherein the settings
comprise listening preferences that define which e-mail

... messages a person on the -trusted network wants to receive.

10 The method of claim 7, wherein:
the trusted referrals relate to products and/or
services for sale; and
the e-mail message includes advertising that is
targeted to the one or more people and that relates to the
products and/or services for sale.

. The message of claim1 , wherein the information
comprises a referral relating to a person, place or thing.

12 The method of claim1 , wherein using the
5 information comprises a buyer and a seller on the trusted
network exchanging information relating to products and/or
services for sale over the trusted network.

13 The method of claim1 , wherein the information
comprises customer referrals for goods and/or services.

14 The method of claim1 , further comprising
obtaining data about a person on the trusted network of
people;
wherein using the information comprises matching the
person to a position based on the data about the person.

15 The method of claim 14, wherein the data comprises
background informati-on for the person and a desired
position.

16 The method of claim 15, wherein the background
information comprises a personal profile that includes one
or more of educational history, employment history, and
skills of the person.

17 The method of claim1 , wherein the trusted
referrals comprise trust in judgment and/or trust in
professional competency/skills.

18 The method of claim1 , wherein:
at least one of the trusted referrals includes
information relating to a degree of trust; and
using the information comprises obtaining information
relating to one or more of the people via the trusted
network based on the degree of trust.

15' 19. The method of claim 18, further comprising
obtaining a rating of trust for a person on the trusted
network based on the degree of trust;
wherein obtaining the information comprises obtaining
the information relating to the person only if the rating of
trust for the person is greater than a predetermined rating.

20 The method of claim 19, wherein the rating is
obtained based on information about the person that has been
provided by people on the trusted network.

. The method of claim 19, wherein the rating is
obtained based on information about the person that has been
provided by people on the trusted network and other people
that are not on the trusted network.

22 The method of claim 18, wherein the degree of
trust comprises an assessment of the professional competency
of a person who is the subject of the at least one trusted
referral.

23 A method comprising:
obtaining a referral via a computer-generated network
of people who are linked to one another based on trust; and
using the referral in a selection process.

24 The method of claim 23, wherein the selection
process comprises screening based on the referral.

25 The method of claim 23, wherein screening
comprises screening potential candidates for a position.

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26 The method of claim 23, wherein screening
comprises screening potential products for purchase/use.
. The method of claim 23, wherein screening
comprises screening potential positions.

28 The method of claim 23, wherein screening
comprises screening potential investments.

29 The method of claim 23, wherein screening
comprises screening potential services for purchase.

30 A method comprising:
receiving information regarding types of messages that
can be received via a trusted network of people;
receiving a message via the trusted network of people;
screening the message based on the information; and
delivering the message if the message comports with the
information.

31 The method-, of claim 30, wherein the information
20 regarding types of messages that can be received comprises
listening preferences which are provided via a computergenerated
graphical user interface.
. The method of claim 31, wherein the types of
messages are defined based on one or more of the following:
a specific level on the trusted network, specific people on
the trusted network, and/or specific streams on the trusted
5 network.

33 The method of claim 31, wherein the types of
messages are defined by a subject matter of the message.

34 A computer program stored on a computer-readable
medium, the computer program comprising executable
instructions that cause a computer to:
obtain trusted referrals from people;
link at least some of the people based on the trusted
15 referrals to create a trusted network on a computer; and
use information on the trusted network.

35 The computer program of claim 34, wherein
obtaining comprises...-receiving the referrals in response to
20 requests.

36 The computer program of claim 34, wherein linking
comprises storing relationships between at least some of the
people that define at least a portion of the trusted
network.

37 The computer program of claim 34, wherein:
each person on the trusted network comprises a node of
the trusted network; and
the computer program further comprises instructions to
store information in association with nodes of the trusted

... network.

38 The computer program of claim 37, wherein the information relates to a person corresponding to a node of the trusted network.

39 The computer program of claim 38, wherein the information comprises an assessment relating to competency of the person corresponding to the node.

40 The computer program of claim 34, wherein using the information comprises sending an electronic mail (e mail) message to one or more of the people on the trusted network. . The computer program of claim 40, wherein the e mail message is delivered to the one or more people based on settings for the one or more people and based on links in the trusted network.

42 The computer program of claim 41, wherein the settings comprise listening preferences that define which e mail messages a person on the trusted network wants to receive.

43 The computer program of claim 40, wherein: the trusted referrals relate to products and/or services for sale; and the e-mail message includes advertising that is targeted to the one or more people and that relates to the products and/or services-for sale.

44 The message of claim 34, wherein the information comprises a referral--'-relating to a person, place or thing.

45 The computer program of claim 34, wherein using the information comprises a buyer and a seller on the trusted network exchanging information relating to products and/or services for sale over the trusted network. . The computer program of claim 34, wherein the information comprises customer referrals for goods and/or services.

47 The computer program of claim 34, further comprising instructions to obtain data about' a person on the trusted network of people; wherein using the information comprises matching the person to a position based on the data about the person.

48 The computer program of claim 47, wherein the data comprises background information for the person and a desired position.

49 The computer program of claim 48, wherein the background information comprises a personal profile that includes one or more of educational history, employment history, and skills.,.-Of the person.

50 The computer program of claim 34, wherein the trusted referrals comprise trust in judgment and/or trust in professional competency/skills.

. The computer program of claim 34, wherein: at least one of the trusted referrals includes information relating to a degree of trust; and using the information comprises obtaining information relating to one or more of the people via the trusted network based on the degree of trust.

52 The computer program of claim 51, further

comprising instructions to obtain a rating of trust for a person on the trusted network based on the degree of trust; wherein obtaining the information comprises obtaining the information relating to the person only if the rating of trust for the person is greater than a predetermined rating.

53 The computer program of claim 52, wherein the rating is obtained based on information about the person that has been provided by people on the trusted network.

54 The computer program of claim 52, wherein the rating is obtained based on information about the person that has been provided by people on the trusted network and I

other people that are not on the trusted network.

. The computer program of claim 51, wherein the degree of trust comprises an assessment of the professional competency of a person who is the subject of the at least one trusted referral.

56 A computer program stored on a computer-readable medium, the computer program comprising executable instructions that cause a computer to:
receive information regarding types of messages that 10 can be received via a trusted network of people;
receive a message via the trusted network of people;
screen the message based on the information; and
deliver the message if the message comports with the information.

57 The computer program of claim 56, wherein the information regarding types of messages that can be received comprises listening preferences which are provided via a computer-generated graphical user interface.

58 The computer program of claim 57, wherein the types of messages are defined based on one or more of the following: a specific level on the trusted network, specific people on the trusted network, and/or specific streams on the trusted network.

59 The computer program of claim 57, wherein the types of messages are defined by a subject matter of the message.

60 An apparatus comprising
a memory which stores executable instructions; and
a processor which executes the instructions to:
obtain trusted referrals from people;
link at least some of the people based on the trusted referrals to create a trusted network in memory; and
use information on the trusted network.

61 The apparatus of claim 60, wherein obtaining comprises receiving the referrals in response to requests.

62 The apparatus of claim 60, wherein linking comprises storing relationships between at least some of the people that define at least a portion of the trusted network.

. The apparatus of claim 60, wherein:
each person on the trusted network comprises a node of the trusted network; and
the apparatus further executes instructions to store

information in association with nodes of the trusted network.

64 The apparatus of claim 63, wherein the information relates to a person corresponding to a node of the trusted network.

65 The apparatus of claim 64, wherein the information comprises an assessment relating to competency of the person corresponding to the node.

66 The apparatus of claim 60, wherein using the information comprises sending an electronic mail (e-mail) message to one or more of the people on the trusted network.

67 The apparatus of claim 66, wherein the e-mail message is delivered to the one or more people based on settings for the one or more people and based on links in the trusted network.

. The apparatus of claim 67, wherein the settings comprise listening preferences that define which e-mail messages a person on the trusted network wants to receive.

69 The apparatus of claim 66, wherein:
the trusted referrals relate to products and/or services for sale; and
the e-mail message includes advertising that is targeted to the one or more people and that relates to the products and/or services for sale.

70 The message of claim 60, wherein the information comprises a referral relating to a person, place or thing.

71 The apparatus of claim 60, wherein using the information comprises a buyer and a seller on the trusted network exchanging information relating to products and/or services for sale over the trusted network.

72 The apparatus of claim 60, wherein the information comprises customer referrals for goods and/or services.
. The apparatus of claim 60, further comprising instructions to obtain data about a person on the trusted network of people;
wherein using the information comprises matching the person to a position based on the data about the person.

74 The apparatus of claim 73, wherein the data comprises background information for the person and a desired position.

75 The apparatus of claim 74, wherein the background information comprises a personal profile that includes one or more of educational history, employment history, and skills of the person.

76 The apparatus of claim 60, wherein the trusted referrals comprise trust in judgment and/or trust in professional competency/skills.

77 The apparatus of claim 60, wherein:
at least one of the trusted referrals includes information relating to a degree of trust; and
using the information comprises obtaining information relating to one or more of the people via the trusted network based on the degree of trust.

78 The apparatus of claim 77, further comprising instructions to obtain a rating of trust for a person on the trusted network based on the degree of trust; wherein obtaining the information comprises obtaining the information relating to the person only if the rating of 10 trust for the person is greater than a predetermined rating.

79 The apparatus of claim 78, wherein the rating is obtained based on information about the person that has been provided by people on the trusted network.

80 The apparatus of claim 78, wherein the rating is obtained based on information about the person that has been provided by people on the trusted network and other people that are not on the trusted network.

81 The apparatus of claim 77, wherein the degree of trust comprises an assessment of the professional competency of a person who is the subject of the at least one trusted referral.

. An apparatus comprising:
a memory which stores executable instructions; and
a processor which executes the instructions to:
receive information regarding types of messages that can be received via a trusted network of people;
receive a message via the trusted network of people;
screen the message based on the information; and
deliver the message if the message comports with the information.

83 The apparatus of claim 82, wherein the information regarding types of messages that can be received comprises 15 listening preferences which are provided via a computergenerated graphical user-interface.

84 The apparatus of claim 83, wherein the types of messages are defined-"@based on one or more of the following:
a specific level on the trusted network, specific people on the trusted network, and/or specific streams on the trusted network.

. The apparatus of claim 84, wherein the types of messages are defined by a subject matter of the message.

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New OSCP protocol, certificate validation engine provides the solution

Business-to-business Internet trade is projected to rocket to \$1.3 trillion by 2003, according to Forrester Research (FORR) and that's just in the United States. Whether or not this projection comes true, or is dramatically exceeded, depends largely on whether companies trust the Internet for high-value transactions, such as signing million-dollar contracts over the Internet.

The Internet's trustworthiness, in turn, depends largely on trading partners' ability to conclusively identify one another online. Ultimately, trading partners must also be able to manage any risk that their counterparts may be impostors, unauthorized agents or e-commerce Web sites being spoofed.

Public key infrastructure (PKI) technology goes a long way toward providing identity certainty. Through the power of cryptography, PKI can:

- * identify trading partners and employees,
- * ensure communications haven't changed in transit; and
- * prove after the fact that the communication actually took place.

A problem, however, has always existed in PKIs: It is difficult to be certain the digital certificates individuals and machines use to identify themselves are valid at the very instant a transaction occurs. Digital certificates often live longer than the privileges they stand for. If an impostor or recently fired employee uses an "old," revoked digital certificate to forge a business deal, millions of dollars could be at risk.

With apologies to the famous New Yorker cartoon, it's important for a business on the Internet to know if its trading partner is a dog. Today, there's just no way to know for sure.

Intimately familiar with this certificate revocation problem, the e-commerce security industry is offering a new standard for realtime (and low-overhead) certificate validation called OSCP, or Online Certificate Status Protocol. The Internet Engineering Task Force (IETF), based in Adelaide, Australia, recently approved OSCP as an RFC (or formal document) on track to become an official Internet standard. Properly implemented, OSCP can bring new levels of trust to business-to-business Internet commerce transactions and dominate the certificate validation marketplace.

E-commerce leaders such as Identrus, the organization formed by world-class financial institutions, are utilizing this standard to deploy a global trust infrastructure for business-to-business ecommerce. Identrus member banks include ABN AMRO, Bank of America (BAC), Barclays Bank, Chase Manhattan (CMB) and Citigroup (C).

"OSCP is a key component of Identrus' risk management strategy as our member financial institutions deploy business-to-business Internet commerce trust services around the globe," says Kristin Kupres, Identrus' chief operating and technology officer.

"Real-time validation capability within and across public key infrastructures is critical for businesses that intend to engage in high-value e-business transactions via the Internet," says Diana Kelley, senior security analyst at the Framingham, Mass.-based Hurwitz Group. "OSCP support and multi-vendor interoperability are features that the market should demand."

The National Automated Clearing House Association, or NACHA, has

successfully trialed OCSP with financial institutions and technology partners.

What's wrong with the traditional way

OCSP is a candidate to displace, or at least supplement, certificate revocationlist(CRL) processing, the traditional, prevailing method of investigating digital certificate status. In this approach, the **trusted entities** that issue digital certificates, called certification authorities (CAs), generate and publish lists of revoked certificates called certificate revocation lists (CRLs). The user or e-business application is relying on the validity of a certificate fetches the CRL to see if the certificate is listed as revoked.

This approach takes a lot of time, consumes significant processing power, and is prone to error, according to OCSP proponents. Specifically:

- * The CRL might not be available because the CA that publishes it might not make its CRL widely available to anyone who wants to see it.
- * The CRL might be outdated. It isn't feasible for CAs to generate, or relying parties to fetch, new lists every second.
- * The trading partner or e-business application might not know how to find the CRL.
- * Particularly for a very active CA, the CRL might grow large too quickly to deliver accurate information to all interested parties.
- * The CA that issued the digital certificate in the first place might no longer be trusted and have had its privileges revoked, casting doubt on a certificate's integrity.

In any of these cases, the recipient can't validate a certificate. If the relying party is not an automated server, but is instead an individual - for instance, one of several representatives in a call center - then these CRL distribution problems are magnified: The CRL must be copied to all the possible recipient desktops. Processing and searching these lists can be time-consuming and complicated for the user or e-business application, making the undertaking fraught with potential error. The CRL retrieval process also can devour storage capacity, desktop memory and bandwidth throughout a network.

Even if these problems didn't exist, there are two additional problems CRLs cannot solve:

- * Without special processing, relying parties can't prove they properly checked the most recently available CRL at that instant. In other words, there is no guarantee that the relying party performed its due diligence.
- * Just by looking at a CRL, a relying party can't tell if the certificate he/she received was indeed a properly issued certificate (as opposed to a "fake" certificate, or one shoddily prepared by latenight hackers).

OCSP provides real-time, low-overhead certificate validation

OCSP addresses all of these concerns. It provides the basis for certificate validation engines that report certificate status in real time, lighten client-processing loads, simplify end-user searches, and eliminate the need to configure multiple clients to multiple certification authorities.

Under the OCSP protocol, relying parties send specific information about the certificates they receive to a validation engine called an OCSP responder, rather than processing a CRL. The OCSP responder contains all the information in relevant CRLs, since it has processed the lists itself. Then the OCSP responder returns to relying parties a reply that indicates - definitively - whether or not the certificate is still valid.

The OCSP responder digitally signs these replies, as well as the queries, enabling relying parties to prove they carried out their due diligence.

OCSP brings a host of additional benefits. The relying party can send a set of bytes called a nonce that the OCSP responder includes in its reply. This process allows a relying party, such as a Web server, to tie a particular OCSP request/reply to a particular transaction. This process also provides further auditable proof that the relying party acted properly (i.e., performed its due diligence) when deciding whether or not to authorize a particular transaction. Also, OCSP consumes less network

bandwidth than CRL processing, since it involves transmitting information about the status of a single certificate, not thousands of revoked ones. And OCSP is more immediate: Administrators can perform instant, "fast-path" revocations of digital certificate privileges manually, providing real-time status before the next CRL the trusted entity issues is processed.

OCSP allows flexible configurations to meet companies' needs

In its simplest deployment, OCSP allows an enterprise to consolidate its status-checking with a centralized server in the same way that many departments centralize mail and print servers. In this model, PC users, Web servers and others servers would point to the same OCSP responder even though they are handling digital certificates in different ways.

As an organization interacts with more trading partners, it will need to validate certificates issued by multiple certificate authorities. Rather than continuously fetching CRLs from a multitude of CAs - which is unfeasible - OCSP lets the organization configure multiple CAs to a single OCSP responder. Likewise, for global companies and global PKIs, trading partners might come from two entirely separate PKIs. In this case, companies can deploy peer OCSP responders.

These alternatives make it easy - and in fact possible - for users and applications to know a trading partner's certificate is valid as they enter a transaction. For truly global organizations, or when the value (financial, political or otherwise) of transactions is very large, trading partners might need to go one step further. In addition to validating one another's digital certificates, they can validate one another's OCSP responders to ensure that neither has been compromised. In this situation, the businesses can agree to deploy a PKI that provides a tree of OCSP responders.

A root responder, run on behalf of all the participants, can sit at the top of this trust hierarchy and verify the validity of each trading partner's responder to all other participants. An initial deployment of such a PKI might set up only the interconnections and "trustpaths" between the various top-level businesses and the root. If that's the case, a user would need to perform the OCSP query manually, which would entail a few mouse clicks.

As the parties develop consistent business practices or system rules, these checks can be made automatic and built into the processing of each OCSP responder, alleviating the client of all complicated processing.

With any or all of these OCSP mechanisms in place, trading partners will be at far less risk than if they accept digital certificates at face value. Companies will be safer than if they have their users and applications continuously fetching CRLs. They will have performed their due diligence in a fraction of the time while consuming fewer network and computing resources. Plus, they will know for certain that a given digital certificate was valid at the instant a transaction took place.

This level of security is a giant step toward a thriving business-to-business Internet commerce infrastructure that finally enables auto makers to carry out million-dollar purchases on the Internet. Both sides can know that their counterparts are who they say they are, and are still agents of their companies in good standing, or not. And on the Internet, dogs will be revealed as dogs, and business-to-business commerce can thrive.

Rich Salz, salzr@certco.com, is a consulting engineer at CertCo., a provider of software and hardware to secure high value business-to-business Internet commerce. Salz was the principal designer for CertValidator, the company's digital certificate repository and OCSP responder.

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